

IN THE CLAIMS

1-31. Cancelled

32. (previously presented) An electronic control having output circuitry to
5 operate a device, said control including sensing means to scan said output
circuitry, said output circuitry including one or more energizing circuits, said
energizing circuits containing one or more transducers, said transducers
requiring currents to be energized, said energizing circuits including switches,
said switches capable of carrying said currents, said switches having intended
10 states, said energizing circuits carrying said currents,
said transducers having a potential to cause said device to operate in a
hazardous manner if said transducers are mistakenly energized,
said transducers never causing said device to operate in a hazardous
manner when said transducers are in an unenergized state,
15 at least one of said switches being a monitored switch, said monitored
switch changing state at a frequency,
each of said energizing circuits, that include said monitored switch,
having off periods when no electricity flows through said monitored switch,
said control;
20 using said sensing means to ascertain said frequency said monitored
switch changes state,
prolonging said off periods if said frequency is too high for said
monitored switch to safely operate.

33. (previously presented) The electronic control in accordance with claim
25 32 wherein said sensing means scans said energizing circuits.

34. (previously presented) The electronic control in accordance with claim
33 wherein said intended states of said switches are known to said control
whether said intended states are set by said control or an override in said
device,
30 said control;

identifying any of said switches as functional switches that said sensing means verifies are in said intended states,

identifying any of said switches as non-functional switches that said sensing means verifies are not in said intended states,

5 using at least one of said functional switches to preclude said currents from flowing through one or more of said non-functional switches preventing said transducers from being mistakenly energized.

35. (previously presented) The electronic control in accordance with claim 34 wherein said energizing circuits contain at least one externally operated
10 switch, said externally operated switch having an externally determined intended state, said control being unaware of said externally determined intended state, said sensing means determining whether said externally operated switch is open or closed.

36. (previously presented) The electronic control in accordance with claim
15 34 wherein at least one sensor of said sensing means scans said switches in a plurality of said energizing circuits.

37. (previously presented) The electronic control in accordance with claim
20 33 wherein said intended states of said switches are known to said control whether said intended states are set by said control or an override in said device,

said control identifying any of said switches as functional switches that said sensing means verifies are open when said intended states are open,

said control identifying any of said switches as erroneously closed switches that said sensing means verifies are not open when said intended states
25 are open,

using at least one of said functional switches to preclude said currents from flowing through one or more of said erroneously closed switches preventing said transducers from being mistakenly energized.

38. (previously presented) The electronic control in accordance with claim
30 37 wherein at least one of said switches can be independently opened by either said control or an override.

39. (previously presented) The electronic control in accordance with claim 37 wherein at least one sensor of said sensing means scans said switches in a plurality of said energizing circuits.

40. (previously presented) The electronic control in accordance with claim 37 wherein said energizing circuits contain at least one externally operated switch, said externally operated switch having an externally determined intended state, said control being unaware of said externally determined intended state, said sensing means determining whether said externally operated switch is open or closed.

41. (New) The electronic control in accordance with claim 33 wherein said energizing circuits include a first energizing circuit, said switches in said first energizing circuit being first switches, at least one of said transducers being a first transducer, said first energizing circuit including said first transducer, said first transducer requiring a first current to be energized, said first switches capable of carrying said first current, said sensing means including a first sensing means, said control using said first sensing means to scan said first energizing circuit,

said first energizing circuit having first idle periods throughout which said first switches are expected to be open,

said control using said first sensing means to;

identify each of said first switches as either first functional switches or first erroneously closed switches during said first idle periods,

identify any of said first switches as said first functional switches that said first sensing means verifies are open during said first idle periods,

identify any of said first switches as said first erroneously closed switches that said first sensing means verifies are not open during said first idle periods,

said control using said first functional switches to preclude said first current from flowing through said first erroneously closed switches, preventing said first transducer from being mistakenly energized.

42. (New) A device including a control, said device having a first energizing circuit, said first energizing circuit containing at least one first

transducer, said first energizing circuit containing a plurality of first switches, said device including circuitry allowing said control to operate said first switches, said first transducer requiring a first current to be energized, said first switches capable of carrying said first current, said device including a first

5 sensing means to scan said first energizing circuit,

said first transducer having a potential to cause said device to operate in a hazardous manner if said first transducer is mistakenly energized,

said first transducer never causing said device to operate in a hazardous manner when said first transducer is in an unenergized state,

10 said first energizing circuit having first idle periods throughout which said first switches are expected to be open,

said control using said first sensing means to;

identify each of said first switches as either first functional switches or first erroneously closed switches during said first idle periods,

15 identify any of said first switches as said first functional switches that said first sensing means verifies are open during said first idle periods,

identify any of said first switches as said first erroneously closed switches that said first sensing means verifies are not open during said first idle periods,

20 said control using said first functional switches to preclude said first current from flowing through said first erroneously closed switches, preventing said first transducer from being mistakenly energized.

43. (New) The device in accordance with claim 42 wherein said control uses one sensor of said first sensing means to identify more than one of said first switches as either said first functional switches or said first erroneously
25 closed switches during said first idle periods.

44. (New) The device in accordance with claim 42 wherein said first energizing circuit has a first paused period, said first paused period beginning when said control attempts to stop said first current by opening one of said first switches, said first paused period ending when said first current resumes,
30 throughout said first paused period one of said first functional switches opens if

and only if said first sensing means determines said first current has not stopped.

45. (New) The device in accordance with claim 42 wherein said device includes a first override, said first energizing circuit containing a first override switch being connected to and solely operated by said first override, said first override being in one of two states, a normal state or an override state, during said normal state said first override switch is expected to be closed, during said override state said first override switch is expected to be open, said first override also having a connection to an input of said control, said input informing said control whether said first override is in said override state or said normal state, said first energizing circuit having a first paused period, said first paused period beginning when said first override attempts to stop said first current by opening said first override switch, said first paused period ending when said first current resumes, throughout said first paused period one of said first functional switches opens if and only if said first sensing means determines said first override switch has not opened.

46. (New) The device in accordance with claim 42 wherein said device includes a first override, said first energizing circuit containing a first override switch, said first override connected to said first override switch, said first override switch being one of said first switches, said first override being in one of two states, a normal state or an override state, during said normal state said first override switch is solely operated by said control, during said override state, as a direct consequence of said first override, said first override switch is expected to be open, said first override also having a connection to an input of said control, said input informing said control whether said first override is in said override state or said normal state.

47. (New) The device in accordance with claim 46 wherein said first energizing circuit has a first paused period, said first paused period beginning when said first override attempts to stop said first current by opening said first override switch, said first paused period ending when said first current resumes, throughout said first paused periods one of said first functional switches opens

if and only if said first sensing means determines said first override switch has not opened.

48. (New) The device in accordance with claim 42 wherein said first energizing circuit includes a multi-throw switch, said multi-throw switch having
5 an intended state, said intended state is known to said control, said control;
identifying said multi-throw switch as a non-functional multi-throw switch if said sensing means verifies said multi-throw switch is not in said intended state,

10 using said first functional switches to preclude said non-functional multi-throw switch from causing said first transducer to be mistakenly energized.

49. (New) The device in accordance with claim 42 wherein said first energizing circuit contains at least one externally operated switch, said externally operated switch having an externally determined intended state, said control being unaware of said externally determined intended state, said first
15 sensing means determining whether said externally operated switch is open or closed.

50. (New) The device in accordance with claim 42, said device having a second energizing circuit, said second energizing circuit containing at least one second transducer, said second energizing circuit containing a plurality of
20 second switches, said device including circuitry allowing said control to operate said second switches, said second transducer requiring a second current to be energized, said second switches capable of carrying said second current, said control having circuitry to operate said second switches, said device including a second sensing means to scan said second energizing circuit,

25 said second transducer having a potential to cause said device to operate in a hazardous manner if said second transducer is mistakenly energized,

said second transducer never causing said device to operate in a hazardous manner when said second transducer is in an unenergized state,

said second energizing circuit having second idle periods throughout
30 which each of said second switches are expected to be open,
said control using said second sensing means to;

identify each of said second switches as either second functional switches or second erroneously closed switches during said second idle periods,

identify any of said second switches as said second functional switches that said second sensing means verifies are open during said second idle

5 periods,

identify any of said second switches as said second erroneously closed switches that said second sensing means verifies are not open during said second idle periods,

said control using said second functional switches to preclude said second
10 current from flowing through said second erroneously closed switches,
preventing said second transducer from being mistakenly energized.

51. (New) The control in accordance with claim 50 wherein said first
sensing means and said second sensing means have a common sensor, said
control uses said common sensor to identify one or more of said first switches
15 as either said first functional switches or said first erroneously closed switches
during said first idle periods and one or more of said second switches as either
said second functional switches or said second erroneously closed switches
during said second idle periods.

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